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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/828,626	04/21/2004	Neelesh B. Mehta	MERL-1563	5827

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EXAMINER	
LAI, DANIEL	

ART UNIT	PAPER NUMBER
2617	

MAIL DATE	DELIVERY MODE
04/23/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/828,626	MEHTA ET AL.	
	Examiner	Art Unit	
	DANIEL LAI	2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 February 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gore et al. (US 2002/0102950 A1, hereinafter Gore) in view of Tujkovic et al. (US 6,934,320 B2, hereinafter Tujkovic).

Regarding claim 1 and 8, Gore discloses a method and a system for transmitting an input stream of symbols in a multiple-input/multiple-output (MIMO) wireless communications system including M subgroups of transmitting antennas (Abstract, paragraph 18). Gore discloses selecting, according to channel conditions of the MIMO wireless communication system, L subgroups of the M subgroups of antennas, where L<M (paragraph 16, where Gore discusses selecting an optimal set of antenna according to wireless link criteria, paragraph 18, where Gore discusses MIMO system, paragraph 20, where Gore discusses selecting k antennas from n available antennas). Gore discloses demultiplexing the input stream into L substreams, there being one substream for each of the L selected subgroups of antenna (paragraph 20, where Gore discusses k RF chains and k transmit antennas). Gore discloses space-time processing signals to be transmitted from each antennas and optimizing wireless link by using the feedback information in the transmission process (paragraphs 19 and 23). Gore also discloses transmitting the set of output streams using the L subgroups of antennas (paragraph 16), but does not explicitly disclose adaptively modulating and coding the L substreams and space-time transmit diversity encoding each of the L coded substreams. In an analogous art, Tujkovic discloses adaptively modulating and coding each of the L substreams to a coded substream (column 3, line 37-column 5, lines 59 and figure 1). Tujkovic discloses space-time transmit diversity encoding the L coded substreams into output streams to be transmitted by a corresponding one of two transmit antenna (column 7, lines 43-65). Tujkovic discloses the invention reduce complexity in

spatial multiplexing of signals over different transmit antennas (paragraph 12). It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the optimal antennas selection method and system as disclosed by Gore with the coding and encoding steps for orthogonal spatial transmission step and apparatus as disclosed by Tujkovic so that space-time encoding and modulation can be performed with reduced complexity.

Regarding claim 2, Gore further discloses feeding back, from a receiver, channel conditions, and selecting the L substreams to be produced by the demultiplexing according to the channel conditions (paragraph 19).

Regarding claim 3, Gore in view of Tujkovic discloses the limitations of claim 2 as applied above. Gore further discloses capacity, diversity, or any other criteria can be used to determine channel condition, but does not explicitly discloses using signal to interference plus noise ratio (SINR) as a criteria. It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the criteria to determine channel condition as disclosed by Gore by using SINR because one skill in the art would recognize that SINR can be used to determine signal quality of a wireless link and therefore can be used as a criteria to determine channel condition.

Regarding claim 4, Gore further discloses transmitting k RF chains (paragraph 20).

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gore in view of Tujkovic as applied to claim 1 above, and further in view of Kim (US 2003/0103474 A1).

Gore in view of Tujkovic discloses the limitations of claim 1 as applied above. The references do not disclose decreasing the number of antenna to increase system efficiency. In an

analogous art, Kim discloses interference is proportional to number of antennas (paragraph 28). Therefore, reducing number of antenna or channel will reduce interference and increase efficiency. It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the method for transmission disclosed by Gore and Tujkovic to reduce the number of channels disclosed by Kim such that interference can be reduced and hence system efficiency can be increased.

Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gore in view of Tujkovic as applied to claim 1 above, and further in view of Walton et al. (US 2003/0235147 A1, hereinafter Walton).

Regarding claims 6 and 7, Gore in view of Tujkovic discloses the limitations of claim 1 as applied above. Tujkovic further discloses coding each substream, but the references lack interleaving each coded substream and symbol mapping each interleaved substream. Gore and Tujkovic also fail to teach demultiplexing each output stream into a plurality demultiplexed output streams; multiplying each of the plurality of demultiplexed output streams by an orthogonal variable spreading factor; adding the demultiplexed output streams, for each output stream, after multiplication into a summed output stream corresponding to each output stream; and multiplying each summed output stream by a scrambling code. In an analogous art, Walton discloses coded data is interleaved and further modulated (i.e., symbol mapped) (paragraph 38). Walton discloses demultiplexing each output stream into a plurality demultiplexed output streams; multiplying each of the plurality of demultiplexed output streams by an orthogonal variable spreading factor; adding the demultiplexed output streams, for each output stream, after

multiplication into a summed output stream corresponding to each output stream; and multiplying each summed output stream by a scrambling code (paragraphs 152-156; Fig. 11). Walton discloses that a MIMO OFDM system may be designed to include diversity transmission modes, which may be used to achieve higher reliability for certain data transmission (paragraph 12). Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the optimal antennas selection method and system as disclosed by Gore and the coding and encoding steps for orthogonal spatial transmission step and apparatus as disclosed by Tujkovic with the MIMO OFMD method as disclosed by Walton such that reliability of data transmission can be improved.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL LAI whose telephone number is (571)270-1208. The examiner can normally be reached on Monday – Thursday, 9:00 a.m. – 4:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lester Kincaid can be reached on (571) 272-7922. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. L./
Examiner, Art Unit 2617

/Lester Kincaid/
Supervisory Patent Examiner, Art Unit 2617